Semantic Representation Formats for Focus

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Kinds of focus

We have to distinguish between

- Expression of focus
  - prosody (pitch, duration, amplitude)
  - syntactic expression / facilitation of focus (cleft, scrambling)
- Function of focus
  - question / answer agreement
  - textual coherence (sentences answer questions under discussion)
  - expression of contrast (monologue, dialogue)
  - focus bound by focus-sensitive particles (but: Beaver & Clark 2008)
- Semantic nature of focus: Some options
  - focus as information structuring, without affecting truth conditions
  - focus as affecting truth conditions (e.g., focus-sensitive particles)
  - focus as information structuring that may secondarily affect truth conditions
- Semantic functions of focus
  - Highlighting information
  - Expressing new information
  - Expressing existence presupposition
  - Expressing presence of alternatives relevant for interpretation

Bound vs. Free Focus

- Bound focus
  - Focus-sensitive operator, e.g. *only*, associates with focus

    John only introduced BILL$_F$ to Sue.

    'Bill is the only x such that John introduced x to Sue.'

    John only introduced Bill to SUE$_F$

    'Sue is the only x such that John introduced Bill to x.'
- Free focus
  - No overt focus-sensitive operator.

    A: *Who did John introduce to Sue?*
    B: *John introduced BILL$_F$ to Sue.*
  - Possible association with illocutionary operator (Jacobs 1984):

    ASSERT [*John introduced BILL$_F$ to Sue*]

    Speaker asserts: 'John introduced Bill to Sue';
    speaker acknowledges that at the point of conversation,
    the assertion of propositions 'John introduced x to Sue' is of interest;
    speaker does not perform alternative assertions,
    from which addressee can conclude, by Gricean reasoning,
    that speaker lacks evidence for them;
    under assumption that speaker is knowledgeable:
    that speaker knows that they would be false.

Focus sensitivity as a compositionality problem

Compositionality (Frege):

- The meaning of a complex expression ⟦[α β]⟧ can be computed from the meanings of the parts, ⟦α⟧, ⟦β⟧, and the way they are syntactically combined.

  ⟦[$_{VP}$ [$_{VP}$ *introduced Bill to Sue*] [$_{AdvP}$ *in the dining room*]]⟧

  = ⟦[$_{AdvP}$ *in the dining room*]⟧(⟦[$_{VP}$ *introduced Bill to Sue*]⟧)

  = λPλx[P(x) ∧ in.dining.room(x)](introd(b)(s))

  = λx[introd(b)(s)(x) ∧ in.dining.room(b)(s)(x)]

- Types of semantic frameworks:
  - Representational theories: Semantic representation language, e.g. LF
  - Denotational theories: Modell-theoretic objects, e.g. sets of possible worlds, functions from entities to sets of possible worlds
- Compositionality problem with focus-sensitive operators in denotational theories: Focus-sensitive operator may be distant from its focus, yet has to refer to it:

  John only [$_{VP}$ [*introduced BILL*$_{F}$] *to Sue*]

  introd(b)(s)(j) ∧ ∀x∈ALT(b)[introd(x)(s)(j) → x = b]

Semantic theories of Focus Sensitivity

Different proposals for a solution of the compositionality problem

- Basic notions:

  introduced $BILL_F$ *to Sue*

  - F: focus feature, Jackendoff 1972,
    relevant for prosody, and possibly for syntax
  - *Bill*: the focus constituent; b: the meaning of the focus constituent
  - *introduced __ to Sue*: the background
  - *introduced Bill to Sue*: the unfocused constituent
- Theories of focus sensitivity for operators like *only*:
  - Double Access theories:
    only needs focus meaning and background meaning,
    e.g. Focus movement (Chomsky 1976), Structured Meanings (v. Stechow 1981)
  - Replacive theories (Pulman 1995, Gardent & Kohlhaase 1996):
    only needs the meaning of the focus and the unfocused expression
    needs representation semantics, and does not work for multiple focus
  - In-situ Binding Semantics (Wold 1995, 1996):
    only needs the meaning of the background and the unfocused expression,
    interesting framework, little known
  - Alternative Semantics (Rooth 1985):
    only needs the unfocused expression and its alternatives generated by focus

Double Access Theories: Focus movement

Chomsky (1976), here semantically interpreted:

- F marker triggers LF movement.
  - S-Structure:
    [$_{VP}$ *only* [$_{VP}$ *introduced BILL*$_{F}$ *to Sue*]]
  - LF:
    [$_{VP}$ *only* [$_{VP}$ *Bill* 1[$_{VP}$ *introduced* t_1 *to Sue*]]]
    ONLY b λzλx[introd(z)(s)(x)]
  - Interpretation of *only*:
    ⟦[$_{VP}$ *only* [F B]]⟧
    = λx[⟦B⟧(⟦F⟧)(x) ∧ ∀y∈ALT(⟦F⟧)[⟦B⟧(y)(x) → y = ⟦F⟧]]
- Initial argument for focus movement: Weak Crossover
  **The man that she*$_1$ *met liked MARY*$_{F,1}$
  **Mary*$_1$ [*the man that she*$_1$ *met liked* t_1]
  But: Critical discussion by Rochemont (1986).
- Problem for focus movement: Syntactic island violations (Anderson 1972, Jackendoff 1972):
  Sam only [*saw a man* [$_{CP}$ *who was wearing a RED*$_{F}$ *hat*]]
  *[*Which hat*]$_1$ *did Sam see a man* [$_{CP}$ *who was wearing* t_1]

Double Access Theories: Structured Meanings

- Jackendoff 1972:
  Distinction between standard meaning and presupposition skeleton
  John introduced BILL$_F$ to Sue
  - standard meaning: [introd(b)(s)(j)]
  - presupposition skeleton: [introd(x)(s)(j)]
- von Stechow 1981: Structured Meanings, consisting of focus and background:
  - focus-background structures
    John introduced BILL$_F$ to Sue ⟨b, λz[introd(z)(s)(j)]⟩
    introduced BILL$_F$ to Sue ⟨b, λzλx[introd(z)(s)(x)⟩
    only [*introduced BILL$_F$ to Sue*] ONLY(⟨b, λzλx[introd(z)(s)(x)⟩)
  - with ONLY(⟨F, B⟩) = λx[B(F)(x) ∧ ∀z∈ALT(F)[B(z)(F) → z = F]]
    λx[introd(b)(s)(x) ∧ ∀z∈ALT(F)[introd(z)(s)(x) → z = b]]
- Problem (Rooth 1992): Allows for operators that do not occur in language:
  tolfed [*that ...X$_F$ ...*] = *tolfed X$_F$* [*that ... X$_F$* ...]
  I tolfed that HE resembles her 'I told him that he resembles her
  Hence: Structured meanings relax compositionality too much,
  Problem: *tolfed* does not make use of focus alternatives.

Alternative Semantics

Rooth (1985, 1992):

- Distinction between two levels of meanings:
  - ordinary meaning $[\![\alpha]\!]$
  - alternatives to regular meaning $[\![\alpha]\!]^A$
- Focus introduces alternatives:
  - $[\![\alpha_F]\!]^A$ = ALT($[\![\alpha]\!]$), a set of meanings of the type of $[\![\alpha]\!]$
  - unfocused expressions: $[\![\alpha]\!]^A = \{[\![\alpha]\!]\}$, single set of meanings
- Simple composition principle for ordinary meanings and alternatives, e.g.:
  - If $[\![[\alpha\ \beta]]\!] = [\![\beta]\!]([\![\alpha]\!])$,
  - then $[\![[\alpha\ \beta]]\!]^A = \{Y(X) \mid X \in [\![\alpha]\!]^A \wedge Y \in [\![\beta]\!]^A\}$
- Example:

Expression	Ordinary Meaning	Alternatives
introduced	introd	{introd}
BILL$_F$	b	{b, m}
introduced BILL$_F$	introd(b)	{introd(b), introd(m)}
to Sue	s	{s}
introduced BILL$_f$ *to Sue*	introd(b)(s)	{introd(b)(s), introd(m)(s)}

Alternative Semantics

- Focus-sensitive operators take ordinary meaning and alternatives
  - ONLY(O, A) = λx[O(x) ∧ ∀P∈A[P(x) → P = O]
  - ⟦*only introduced BILL*$_F$ *to Sue*⟧

    = λx[introd(b)(s)(x) ∧
    ∀P∈{introd(b)(s), introd(m)(s)}[P(x) → P = introd(b)(s)]

    = λx[introd(b)(s)(x) ∧ ¬introd(m)(s)(x)]
  - needs an intensional framework, P = introd(b)(s) means equality of senses

Alternative Semantics vs. Structured Meanings

Points in favor of Alternative Semantics:

- Predicates like *tolfed* cannot be expressed;
  - Alternative Semantics more restrictive than Structured Meanings, as meaning of focus cannot be recovered from alternatives
- No island sensitivity predicted;
  - Alternative Semantics does not rely on any syntactic movement or equivalent process, as in Strucutred Meanings

Points in favor of Structured Meanings:

- Non-distinctiveness of alternatives, even intentionally (Blok 1993):
  - False prediction of Alternative Semantics:
    Nine only is the square of THREE$_F$. false, 9 also square of –3).
    $9 = 3^2 \wedge \forall P \in \{\lambda x[x=y^2] \mid y \in IR\}[P(3) \rightarrow P = \lambda x[x = 3^2]]\}$
    true, as $\lambda x[x = 3^2] = \lambda x[x = (-3)^2$
  - Right prediction of Structured Meanings:
    $9 = 3^2 \wedge \forall z \in ALT(3)[9 = 3^2 \rightarrow z = 3]$ false, also for z = –3.

Alternative Semantics vs. Structured Meanings

- Problem with multiple focus (Krifka 1992)

  John only introduced BILL$_F$ to Sue.

  John also$_2$ only$_1$ [introduced BILL$_{F1}$ to MARY$_{F2}$]

  - Alternative Semantics: First operator (*only*) takes both foci

    only [*introduced BILL to MARY*]

    ONLY(introd(b)(m), {introd(z)(y) | z∈ALT(b), y=ALT(m)}

  - Structured Meanings: Multiple focus generated by multiple movement

    also [*Mary*$_2$ [*only* [*Bill*$_1$ [*introduced* t$_1$ to t$_2$]]]]

    ALSO(⟨m, λzλx[ONLY(⟨b, λy[introd(y)(z)(x)]⟩)]⟩)

- Problem with correlated focus (v. Stechow 1990, nach E. Zimmermann)

  A: *Are there man girls in the group that are taller than their older brother?*

  B: *I don't think so. I can only see that MARY$_F$ is taller than BILL$_F$.*

  - Alternative Semantics: Foci are introduced independently

    ONLY(see(taller(b)(m)), {see(taller(z)(y)) | z∈ALT(b) ∧ y∈ALT(m)})

  - Structured Meanings: Double focus, restricted by brotherhood relation

    ONLY(⟨⟨m, b⟩, λ⟨y, z⟩λx[see(taller(z)(y)(x)]⟩),

    where ALT(⟨m, b⟩) = {⟨y, z⟩ | girl(y) ∧ elder-brother(y)(z)}

A Hybrid Representation Framework?

Krifka (2006), “Association with Focus Phrases”

- Drubig (1994): Distinction between FocP and F
  - Example:
    only [*introduced* [$_{FocP}$ *the man that JILL$_F$ admires*] *to Sue*]
  - Motivation: Contrastive focus.
    John didn’t introduce [$_{FocP}$ *the man that JILL$_F$ admires to Sue*],
    but... [the man that *BILL$_F$ admired*]
    * *BILL$_F$*
  - Motivation: Short answers
    A: *Did John introduce the man that JILL$_F$ admires to Sue?*
    B: *No,* [*the man that BILL$_F$ admired*].
    **BILL$_F$*
- Hybrid Theory:
  - Operators associate with FocP; this association is syntactically restricted.
    only [$_{VP}$ [$_{FocP}$ *the man that JILL$_F$ admired*]$_1$ [*introduces* t$_1$ *to Sue*]]
  - Focus within the FocP introduces alternatives to the FocP, here:
    {‘the man that Jill admired’, ‘the man that Bill admired’, ...}
  - Focus can be arbitrarily deeply embedded with FocP:
    John only recalled [*the dog owned by* [*the man that introduces BILL to Sue*]]

A Hybrid Theory?

- Example of derivation:

  only introduced [$_{FocP}$ *BILL'S*$_F$ *mother*] *to Sue.*

  only [$_{VP}$ [$_{FocP}$ *BILL'S*$_F$ *mother*] 1[$_{VP}$ *introduced* t_1 *to Sue*]]

  - Derivation of Focus Phrase meaning:

Expression	Ordinary meaning	Alternatives
BILL'S$_F$	b	{b, m}
mother	mother	{mother}
BILL'S$_F$ *mother*	mother(b)	{mother(b), mother(m)}

  - Derivation of Focus meaning:
    ONLY takes Focus Phrase meaning, Focus Phrase Alternatives, and Background

    $ONLY(\langle FocP, FocPA, B\rangle) = \lambda x[B(FocP) \wedge \forall z \in FocPA[B(z) \rightarrow z = FocP]$

    $ONLY(\langle b, \{mother(b), mother(m)\}, \lambda z \lambda x[introd(z)(s)(x)\rangle)$

    $= \lambda x[introd(mother(b))(s)(x) \wedge$
    $\forall z \in \{mother(b), mother(m)\}[introd(z)(s)(x) \rightarrow z = mother(b)]$

    $= \lambda x[introd(mother(b)(s)(x) \wedge \neg introd(mother(m))(s)(x)]$

  - Often, Focus and Focus Phrase coincide

    only [$_{VP}$ [$_{FocP}$ *BILL*$_F$] 1[*introduced* t_1 *to Sue*]]

    $ONLY(\langle b, \{b, m\}, \lambda z \lambda x[introd(z)(s)(x)]\rangle)$

A Hybrid Theory: Questions

- Hamblin approach to questions (Hamblin 1973): Alternatives

  Who did John introduce to Sue?

  {introd(x)(s)(j) | x∈PERSON}

  = {introd(b)(s)(j), introd(m)(s)(j), ...}

- Structured meaning / functional approach to questions: Structures

  Who$_1$ *did John introduce* t$_1$ *to Sue?*

  ⟨PERSON, λx[introd(x)(s)(j)⟩

  λx∈PERSON[introd(x)(s)(j)]

- Proposal: Hamblin, Alternative Semantics, for in-situ-questions; not restricted by syntactic islands.

  John admires [*the man* [*that introduced WHO to Sue*]]*?*

  LF: [[*the man that introduced WHO to Sue*] 1[*John admires* t$_1$]]

  ⟨{ιx[man(x) ∧ introd(x)(z)(s)] | z∈PERSON}, λx[admires(x)(j)]}


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